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AGROPOLITAN AREA DEVELOPMENT IN SUPPORTING ENVIRONMENTAL CONSERVATION FUNCTION IN BOYOLALI DISTRICT, CENTRAL JAVA, INDONESIAFERIANA DWI KURNIAWATI^{1*}, AHMAD YUNUS¹ and AL. SENTOT SUDARWANTO¹*¹Environmental Science Program, Graduate Program in Environmental Sciences Master Universitas Sebelas Maret Surakarta, Indonesia***ABSTRACT**

Boyolali which is an agropolitan district in Indonesia has been initiated since 2003. The main objective of agropolitan development is to support the development of the region to support agriculture and economy. Taken in the implementation of programs and policies of government activity that began to develop in the field of agribusiness, which is then applied by farmers and agribusiness. With the implementation of various programs and activities in the development of the possible development of the region Agropolitan Agropolitan cause various positive and negative impacts to the environment. Agropolitan principle one of which is the development of sustainable agriculture implemented, no negative impact on the environment, and even provides support for environmental protection. Agropolitan development that takes into account the environmental functions to support reforestation in the area of Mount Merapi and Merbabu to reduce the impact of global climate change

The purpose of this study are (1) to determine the implementation of the development in the area Agropolitan Boyolali. (2) to determine the factors that support and hinder the development of agropolitan in support of environment conservation in Boyolali. (3) to find the solution that has been pursued in addressing the factors that hinder the development of agropolitan in support of environment conservation in Boyolali.

The research method used was a descriptive study (descriptive research) and exploratory. The results stand out from this study is that the development agropolitan supporting environment conservation in Boyolali still weak and threatened. However, existing solutions from the government and society in the region to confront agropolitan threats.

Keywords: Agropolitan, Environmental conservation function, climate change

1 INTRODUCTION

The dynamic era development and the demands for welfare have become more dominant and complex. Along with the rapid population growth, the practice to fulfill the demands have generated environmental problems. Thus, environmental problems need to be attended seriously as an integrated system in which each element is related and considered holistically. With the increasing demands on agricultural products along with the population growth, environmental degradation issues surrounding agriculture are surfacing.

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The utilization of natural resources for agricultural activities is not only related to the ecological issue but also closely related to economical and social aspects. The policy of output-input relative price, agricultural exchange value, and the macro policy will bear effect to balanced or imbalanced results and the land resource allocation. The society's social structure, behavior, and values also play important role in the resource utilization pattern. Since the main actors in the agricultural sector are farmers, planters, breeder, and fishermen, it is essential to instill the awareness concerning the importance of practicing environmentally sound agricultural development to them.

Sustainable agricultural development must be able to conserve land, water, and the genetic resources of plants and animals. It should not degrade the environmental quality. And it must be technically appropriate, economically decent, and socially acceptable. The management of natural resources and living environment should be oriented on the effort to improve the human resource in the agricultural sector so that the people can become the agent of agricultural development and living environment nurturer.

The increasing inter-area competition is the phenomenon which will be the main characteristics of the national and international economy dynamics in the third millennium. A region existence will rely heavily on its ability to create excellence basis in the inter-area competition. Inter-area competition is basically the competition of each region's potential in marketing its featured product in both domestic and international market. In Indonesia, inter-area competition is predicted to occur among autonomous regions by promoting the region's potential which is thought to have highest competitive features.

Small town development which has positive function to the surrounding rural areas which rely on the agricultural sectors is known as Agropolitan. Agropolitan area is a system which consists of agricultural resource and featured commodity sub-systems, agrobusiness infrastructure and facility sub-systems, general public facility sub-system, and social welfare and environmental preservation sub-systems.

Boyolali regency is one of 35 regencies in Central Java province. It is located between 1100 22' – 1100 50' East Longitude and 70 36' – 70 71' South Latitude, and on 75-1500 metres above the sea level. It has West to North span of 48 Km North to South span of: 54 Km, and its area covers 101,510.1 hectares (Ha) of land. Administratively, it consists of 19 sub-district, 263 villages, and 4 villages (administrative unit below sub-district), with the total population of 977,026 in 2009. Boyolali is a region which its landscape consists of low land and high land areas, hills, and mountains areas which are suitable for various kinds of plants; crops, plantations, or forestry plants. The land utilization for rice fields covers 22,946.65 Ha of land, and 78,563.53 Ha for dry land. The farmland consists of: technically irrigated rice field of 4,935.35 Ha, semi-technically irrigated rice field of 4,876.01 Ha, modestly irrigated rice field of 2,646.41 Ha and rainfed rice field. With such kind of

environmental conditions, Boyolali regency is deemed to be potential to be developed as agropolitan area.

The rapid development of agropolitan area, along with its other developing sectors, if not being followed with sound efforts to maintain the living environment function, will threaten the life of the living organisms around the area. It can even affect other living organisms in other areas. In accordance to the designated development sequence, It is essential to conduct a study to find out; whether the implementation of Agropolitan area development program in Boyolali regency has generated the expected results such as giving constructive effect in environment management in Boyolali regency, especially in the agropolitan areas of GOASEBO (Cepogo, Ampel, Selo and Boyolali).

Thus, this research is conducted to study the current condition of Agropolitan development program in Boyolali regency, the supporting and inhibiting factors of the program, and the suggestion and solutions which need to be pursued to support Living Environmental function preservation in Boyolali district.

2 METHODOLOGY

This research was conducted in Agropolitan Area in Boyolali in District, in Ampel, Selo, Cepogo and Boyolali sub-districts from March 2009 to December 2011.

The research method used is descriptive and explorative research. The variables of this research are: Natural resource condition, human resource condition, institutions, area's facility and infrastructure, featured commodity, documents arranged for supporting agropolitan area development, and programs and activity done by the government. The data used are primary and secondary data.

The data analysis technique in this research is descriptive statistic analysis. Data selection was then conducted and on the selected data, SWOT analysis was conducted.

3 RESULTS AND DISCUSSION

3.1 Results

Agropolitan area establishment cannot fully develop without pull factor, therefore, a study on the internal and external factors in terms of the area's potential and weakness through SWOT analysis is required. According to the analysis conducted during the study and the field observation, the following formulation of the analysis results are found:

THREATS (T)	ST Strategy	WT Strategi
1)Expensive production facility rate. 2)Seasonal pests attack. 3)Lack of reforestation in landslide-prone areas, lack of green open space, lack of city parks in urban area; 4)Rapid deforestation rate which has not been offset by reforestation 5)The need for active and serious participation from parties related to the programs (government, farmers, and businessman) in realizing the objective of agropolitan area development. without active participation from all parties, the objectives will not be achieved. 6)Central Java Province government has specified 10 featured commodities which can be developed in agropolitan areas in Central Java. This might result in some areas having the same featured commodity. 7)Government inconsistency causing gaps between the development plan and its field implementation.	1) Availability of government financing to provide for expensive production facilities (even though the number is limited). 2) Suitable land resource for agropolitan development which is expected to be able to avoid OPT threat; 3) Community's strong will which does not always rely on the government; 4) Established cow farming for dairy and cattle which is expected to be able to compete with other featured commodities in Central Java province.	1) Minimizing low promotion and low marketing, low product sales have especially featured product oriented for modern market or agency and avoid losing in the competition with other featured product in Central Java; 2) Minimizing plant disease and pest attack every planting season 3) Minimizing disaster threat by reducing deforestation rate and compensating it with reforestation; 4) Optimizing small areas to produce featured products to gain competitive strenght; 5) Minimizing community's economic weakness by empowering the community to avoid dependence on the government which sometimes can be inconsistent.

Source: Analysis 2011

Table 2. External Strategic Factors
(Eksternal Strategic Factors Analysis Summary/EFAS)

External Strategic Factors	Value	Rating	Score value (value x Rating)
Opportunity (O)			
1) Strategic location which can attract investor	0.1	2	0.2
2) the success of Agropolitan development program will improve cooperation network with other regions, especially in agrobusiness.	0.05	2	0.1
3) The construction planning of Semarang – Solo highway.	0.1	3	0.3
4) Boyolali as the center of the regency holds the role as the developing growth pole and the location of Ampel (growth pole) and its location toward Ampel sub-district which becomes the center of agropolitan development is relatively close	0.05	2	0.1
5) Agro-industry development of cow products commodity both cattle and dairy,	0.1	4	0.4
6) The existence of embrionic state of cooperation between ginger farmers in Kembang village of Ampel sub-district with the investors from Thailand..	0.1	2	0.2
Total O	0.5	15	1.3
Threat (T)			
1)Expensive production facility rate.	0.1	-3	-0.3
2)Seasonal pests attack.	0.05	-2	-0.1
3)Lack of reforestation in landslide-prone areas, lack of green open space, lack of city parks in urban area;	0.1	-2	-0.2
4)Rapid deforestation rate which has not been offset by reforestation	0,05	-2	-0,1

5) The need for active and serious participation from parties related to the programs (government, farmers, and businessman) in realizing the objective of agropolitan area development. without active participation from all parties, the objectives will not be achieved.	0.05	-3	-0.15
6) Central Java Province government has specified 10 featured commodities which can be developed in agropolitan areas in Central Java. This might result in some areas having the same featured commodity.	0.1	-4	-0.4
7) Government inconsistency causing gaps between the development plan and its field implementation	0.05	-3	-0.15
Total T	0.5	-19	-1.4
Total Number	1	-4	-0.1

Source: Analisis 2011

Tabel 3. Internal Strategic Factors
(*Internal Strategic Factors Analysis Summary/IFAS*)

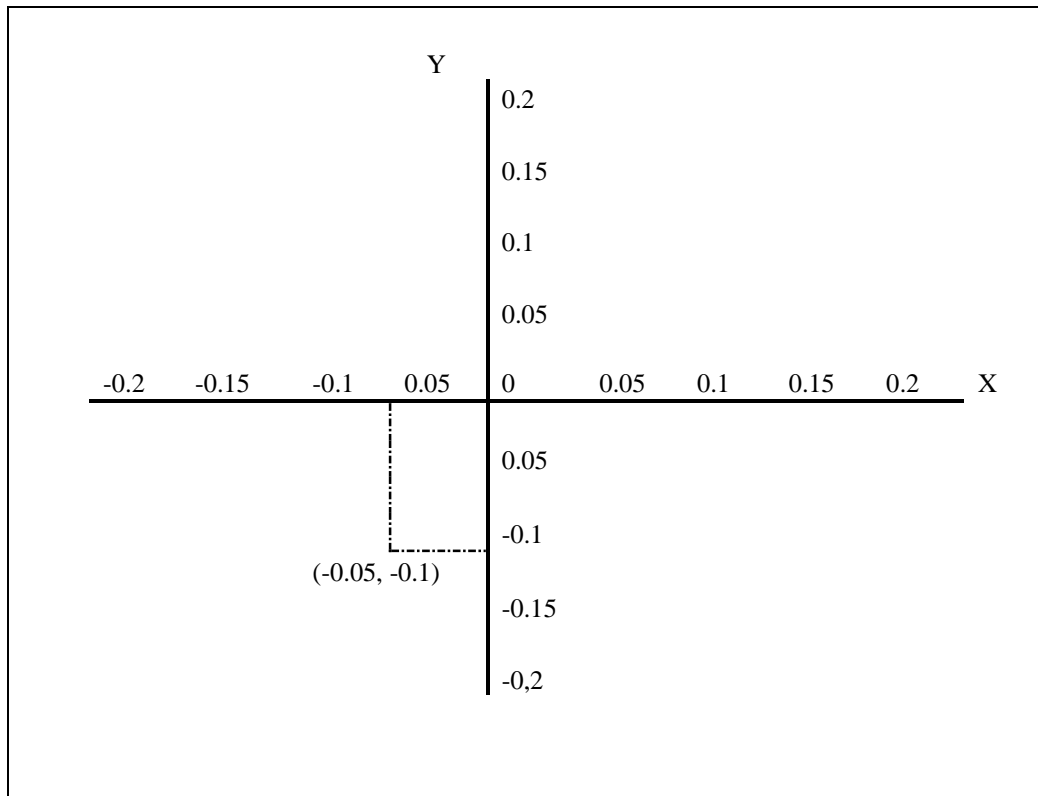
Internal Strategic Factors	values	Rating	Score value (value x Rating)
Strengths (S)			
1) Strategic location of Agropolitan area in Boyolali regency, in the main route of Semarang - Solo and SSB (Solo – Selo – Borobudur)	0.03	4	0.12
2) Relatively proximate location to Adi Sumarmo Airport Solo	0.03	2	0.06
3) Its location between two mountains: Merapi and Merbabu	0.01	2	0.02
4) Trade Mark of Boyolali regency as the center of cow milk commodity	0.02	3	0.06
5) Suitable agricultural land resource for agropolitan development	0.04	4	0.16
6) The ongoing development of cow cattle and dairy farming in Ampel sub-district as featured commodity	0.04	4	0.16
7) Established livestock market facility in Candi village of Ampel sub-district and in Sunggingan Baru market in Boyolali sub-district, slaughterhouse facility and KUD (village level cooperative) in Tanduk village in Ampel sub-district, and condensed milk industry in winong village in Boyolali sub-district which are all supporting factors to the dairy and cattle cow agrobusiness system development.	0.02	4	0.08
8) The will of Ampel community to develop their own region	0.04	3	0.12
9) Ongoing establishment of agro-industry	0.04	2	0.08
10) Established agrobusiness terminal in Ampel sub-districts.	0.04	2	0.08
11) Established vegetable market in Candisari village in Ampel sub-district and in Cepogo sub-district	0.03	2	0.06
12) availability of transportation so it does not hinder marketing and distribution.	0.04	2	0.08
13) Availability of government funding	0.03	3	0.09
14) an Established institutions which support agropolitan development	0.05	2	0.1
15) an Existence of art groups supporting agrotourism.	0.01	2	0.02
16) an Existence of <i>Buka muwur</i> traditional ceremony in Pantaran, Sadranan, etc.	0.01	2	0.02

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17) an existence of Guwo Lowo tourist attraction in Ngadirojo, Tomb, and Gilang water spring in Sampetan.	0.02	3	0.06
Total S	0.5	46	1.37
Weakness (W)			
1) Limited water supply both for consumption and farming,	0.08	-3	-0.24
2) Its location between the two mountains, causing some of its areas is located in conservation area and disaster-prone areas	0.006	-2	-0.012
3) Less optimized farmer groups in agrobusiness development program	0.006	-2	-0.012
4) Low mastership of agricultural technology	0.005	-3	-0.015
5) Plant diseases and pests unmanageable by the farmers	0.004	-2	-0.008
6) Accessibility problem to several villages due to its location in mountain slopes	0.05	-2	-0.1
7) Insufficient road structure	0.1	-3	-0.3
8) The land owned by each farmer are relatively small, less than 1 hectare;	0.01	-3	-0.03
9) Cattle owned by each breeder are relatively few, less than 10 each;	0.006	-3	-0.018
10) Most of the farmers come from low economy class	0.006	-3	-0.018
11) Limited and insufficient professional worker to support agropolutan development	0.007	-2	-0.014
12) Limited agricultural product processing unit	0.006	-3	-0.018
13) Lack of waste management facility	0.007	-3	-0.021
14) Less availability of decently featured commodity livestock shed	0.1	-3	-0.3
15) The absence of agrobusiness sub-terminals in sub-districts	0.007	-2	-0.014
16) Lack of marketing and promotion, low product sales especially featured product oriented for modern market	0.1	-3	-0.3
Total W	0.5	-42	-1.42
Total number	1	4	-0,05

Source: Analysis 2011



Picture 1. SWOT Analysis diagram

3.2 Discussion

According to the SWOT analysis result, it is found that factors supporting agropolitan area development which support environmental function preservation in Boyolali regency is in weak and threatened position. Agropolitan supporting factors can not be separated from several institutional organizations such as farmer groups, KTNA (farmer and fisherman community), social institutions, cooperatives, etc.

The main problem in developing agropolitan is the need for competitive strength in order to develop a number growth sectors optimally. Thus, construction of decent road structures and transportation system is essential so that the traffic of people and goods is within the standard time scope. The building elements of agropolitan are the featured sectors, agrobusiness activity centers, marketing potential, and the supporting infrastructure and facility.

Agropolitan area in Boyolali regency consists of agricultural towns and the surrounding villages with agricultural production centers which also have a facility such as shops. Agropolitan area development is conducted on the agricultural production supplier regions by developing *Desa Pusat Pertumbuhan (DPP)* (Growth Center Villages) which are expected to push, pull, hold, agrobusiness development activity in hinterland villages and the neighboring villages.

Agropolitan area development program in Boyolali is an agriculture based economy development in agrobusiness area. It is designed and implemented by pursuing synergy among various potential to develop a system and agrobusiness practice which possesses competitive strength, community orientation, sustainability, and decentralized management, which is motored and facilitated by the government. Agropolitan area development program in Boyolali is an approach which combines mutually beneficial urban and rural development, based on the agricultural/agrobusiness potentials, and oriented to support living environmental function preservation.

Considering the varied area width among the villages and sub-districts, the area for agropolitan units are also varied for each village and subdistrict. To ease the establishment of featured commodity and agropolitan location, the sub-district administrative level can be used as the smallest unit of the agropolitan area. Therefore, the area establishment of the agropolitan area development program is specified in four location; Cepogo, Ampel, Selo and Boyolali subdistricts. This establishment is based on many supporting factors especially the living environmental function factors in the area. Living environmental function can be defined as all matters, conditions, circumstances, and influences, which exist in the space where we live in, which bear effect to a living being, including human life.

Agropolitan development has been adapted to Boyolali regency urban planning. And considering that the purpose of this work is to develop agropolitan area facility and infrastructure, its implementation is adapted to correspond with both Boyolali regency's and agropolitan area program's medium-term development plan. Thus, the provision of infrastructure and facility fits the requirements of the masterplan. However, due to the limited budget, both in local and central government, not all of the infrastructure and facility can be provided.

The follow-up steps regarding the establishment of pilot regions of agropolitan area development program are; training of regency's POKJA (working group), field coordinator in the agropolitan area, and field guide in village level in 2004-2011; socialization to all villages in Ampel sub-district; formulation of master plan; and human resource development through training and comparative study for farmers and officials.

In term of production, the productivity level of agrobusiness products in Boyolali regency is still low. This can be seen from the small number of annual production of agrobusiness products. The low number of production seems to be caused by the limited land are and cattle owned by the farmers. The activities in the agropolitan area are dominated by cultivation activity of crops (rice, corn, and cassava), vegetables (chili, carrot, and bean), fruits (banana, durian, papaya, mango, and thorny palm), livestock (dairy and cattle cows), and plantations (coconut, clove, tobacco, and ginger). Crops production is still the main

resource. Fulfillment of society's basic food, the source of carbohydrate (starch), is dominated by rice since most of the Indonesian people consume rice as their basic food.

Products derived from large livestock (cow, buffalo) and small livestock (goat, sheep, rabbit) consist of meat and milk; and products derived from poultry (chicken, duck, and quail) consist of meat and egg. Similar to the crop consumption pattern, in livestock consumption pattern, the number of consumption for each commodity depends highly on the population number of the agropolitan area and the community's income level.

In term of human resource, competent and competitive human resource is required in the effort of developing agropolitan area. According to the data from each sub-district, in term of education, there is already a sufficient number of human resource coming from higher education (university level), diploma, and high school level. However, in term of skill and technology mastership which support agropolitan area development such as agrobusiness, industry, services, and other skills requiring training and workshops are still lacking. Thus, efforts to develop human resource in agrobusiness is necessary. Without the support of sufficient human resource, agropolitan development program will face many kinds of drawbacks. Orientation to agrobusiness technology is also essential to encourage business development. Through many kinds of training, counseling, and updated technological orientation, a competitive and competent system of the society in the effort to develop agrobusiness can be established. With the society's improved skill set, the practice of developing agropolitan area will run more smoothly and will eventually result in the improvement of the community's quality of life.

In term of capital, the problem faced by the society is that generally the people do not have private capital and they do not have the collateral to get a capital loan for business, especially for processing and marketing activities. It can be seen that the society's economic condition is still relatively weak. Capital issues can generally be solved by developing economic institutions in villages as procurement effort to provide capital loan for the society. Capital financial support can be given in form of business partnership. Thus, institutional development of rural economy should be developed to support capital procurement. In this case, government participation is of great importance.

In 2012, agropolitan activities funded by the government, both local and central government, were stopped, however, agropolitan activities which have been conducted by the people in Cepogo, Ampel, Selo and Boyolali since 2003 persist. The people who receive livestock capital aid keep developing their livestock breeding/raising, the people who receive BLM (direct capital aid) keep proceeding their activities. Thus, indirectly, the agropolitan program persists to develop well. Therefore, the central government found it necessary to refinance the program by allocating it from the national budget, provincial budget, and regional budget of 2013. In 2013, according to RTRW regional regulation,

effective since 2011, Boyolali regency and two other additional sub-districts of Sawit and Bayudono, will be developed as agropolitan area, particularly as minapolitan.

The establishment of Agropolitan area in Boyolali regency also takes its strategic location into account. It is located on the main route connecting Semarang - Solo and Borobudur (SSB route). This makes the agropolitan area accessible in a high mobility level. It is also located in a relatively proximate location with Adi Sumarmo airport, Solo. Its location between the two mountains of Merapi and Merbabu and its established trademark as a center region for cow milk commodity production are beneficial factors in developing the agropolitan area.

However, there are also some drawbacks due to its location among the two mountain of Merapi and Merbabu. Due to its location, some of the agropolitan area lies in the conservative area and the disaster-prone area which generate limiting factors in developing the area. Its location on the mountain slopes also causes difficulty in term of accessibility to the area. It also leads to distribution problem in developing agrobusiness. Distribution activity in marketing activity is basically the parameter of the product's competitive strength. Most of the ongoing agrobusiness product distributions have not been market-oriented activity. It means that the common distribution activities have not aimed to the larger scale market. The distribution level is only limited to the local area even though trial efforts with foreign parties have been promoted.

According to the SWOT analysis, It seems that the agrobusiness condition in Boyolali regency is still on a weak and threatened position. The position of agropolitan area development which supports living environmental function preservation is on the coordinate of $[-0.05; -0.1]$. Referring to the SWOT analysis results, several aspects are closely related toward each other. Those related aspects are human resource aspects, environmental aspects, processing aspects, marketing and distribution aspects, policy aspects, institutional aspects, capital aspects, production aspects, and other supporting aspects. The relations among those aspects show that in developing agropolitan area which support environmental function preservation, a synergy integrating all of that aspects is necessary. If there is any change in one of the aspects will lead to significant changes in other related aspects. Those related aspects are the main aspects of concern in developing agropolitan area which supports environmental function preservation. The related pattern of strength-weakness-opportunity-threat as explained above show how any change in each aspect will affect other aspects.

The strategy needed to solve the weak agrobusiness condition is to minimize the identified weaknesses and avoid incoming threats. Therefore, the condition and development opportunity of agropolitan area development program which supports environmental function preservation in Boyolali regency will be strengthened.

Infrastructure and facility have a positive relation with human resource, capital, marketing, and distribution, institutional, and policy factors. Infrastructure and facility factor includes irrigation condition, road condition, access to electricity, agrobusiness availability, agrobusiness terminal establishment, transportation quantity and cost. Another supporting aspects such as environmental condition has both positive and negative relation with human resource, production, processing, capital, marketing and distribution, policy, institutional, and infrastructure and facility aspects. Other supporting aspect is its location in Solo - Semarang main route and in Solo-Selo-Borobudur (SSB) site development.

Other supporting infrastructure and facilities are livestock market facilities in Candi village in Ampel sub-district and in Sunggingan Baru market in Boyolali sub-district, slaughterhouse facility, KUD (village level cooperatives), a vegetable market in Candisari village and in Cepogo sub-district, and agrobusiness terminal establishment in Ampel sub-district. All of these facilities contribute positively in developing agropolitan area in Boyolali regency.

Limited government budget and underdeveloped community's economic cycle cause financial restrictions in developing agropolitan area especially in terms of infrastructure and facility provision, environmental preservation-oriented development, provision of perennial seeds for reforestation, and livestock and land improvement for farmers.

Agropolitan concept in Boyolali regency is a policy of Boyolali regency government which apply integrated approach from several economic departments for rural development, especially in agriculture, by building infrastructures, giving more access to a business capital loan to improve farmers income, and pushing industrial growth to improve added value of the agricultural sector. This program is designed and implemented by synergizing various existing potentials to develop agrobusiness system and practice which are competitive, community-based, sustainable, and decentralized.

4 CONCLUSION

From the findings of the study, several conclusions are formulated as follow:

- a. Agropolitan development that takes into account the environmental functions to support reforestation in the area of Mount Merapi and Merbabu to reduce the impact of global climate change.
- b. Agropolitan area in Boyolali regency has the potential to be developed but agropolitan area development which support environmental function preservation in Boyolali regency is on the weak and threatened position.
- c. Factors supporting agropolitan area development are as follow:

- a) Availability of infrastructure and facility which support agropolitan area development;
 - b) Strategic location;
 - c) compatible agricultural resources;
 - d) Various agricultural products which can be developed for agrobusiness practice;
 - e) Established and ongoing Off-farm activities;
 - f) The existence of tourist attraction and art center in the area;
 - g) Established community institutions: Forum peduli Ampel, farmer group, farmer cooperatives, KTNA (farmer and fisherman community), KUD (Village level cooperative), slaughterhouse community, medicinal herbs farmer community, etc;
 - h) Program implementation, activities, and budget allocation conducted by the government for supporting living environmental function preservation.
- d. Inhibiting factors of agropolitan area development in Boyolali regency are as follow:
- a) Some lacks in public and social infrastructure and facility;
 - b) Rapid physical development which reduces open green space and water catchment area;
 - c) The number of agrobusiness processing activities which have not taken environmental preservation into account and result in the growing amount of environmental pollution;
 - d) Rapid deforestation rate;
 - e) Increased transportation, both people and goods transportation, which also increase air pollution rate;
 - f) urban development which is not accompanied by the community's awareness toward environmental preservation, causing roads, roadside parks, public facilities, and other infrastructures to be unattended and damaged.
- e. Solutions pursued in solving inhibiting factor of agropolitan area development are as follow:
- a) Building public facilities such as village access road, intercity streets, Solo – Semarang highway construction, agrobusiness terminal establishment, development Terminal Agribisnis, communal cage constructions which are completed with Green Open Space, and other establishments to minimize insufficient public and social facility;

- b) There has not been any appropriate solution concerning the rapid physical development and the decreasing open green space and water catchment area;
- c) Reducing environmental pollution due to agro-industry by constructing WWTP and giving socialization on the importance of sustaining environmental function preservation;
- d) Increasing socialization on the importance of forest function and perennial planting to reduce the rapid rate of deforestation.;
- e) Increasing freight transportation, both human or goods transportation which also increase air pollution.

5 SUGGESTION

Several suggestions are proposed as follow:

- a. Engaging farmers to be involved more optimally;
- b. Engaging every sectoral institution in villages to develop agrobusiness and agro-industry pattern simultaneously;
- c. Synergizing featured commodity development with the required structure and space scale;
- d. Improving continuity of infrastructure and facility in the area in a long term planning program;
- e. Improving regional autonomy role to manage agricultural area independently;
- f. Improving accessibility and protection of the produced commodity to be marketed nationally and internationally;
- g. In order to preserve environmental ecology, it is advised not to practice monocultural and incompatible plant farming which may harm the environment, even if the economic value is high.

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